

DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER BUREAU  
SUPPLYING WATER TO THE PUBLIC

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of the Michigan Administrative Code are amended as follows:

## PART 6. STATE DRINKING WATER STANDARDS AND ANALYTICAL TECHNIQUES

R 325.10601a Compliance with standards to be determined in accordance with monitoring requirements; analytical results to be performed by certified laboratories.

Rule 601a. (1) Compliance with the drinking water standards specified in this part shall be determined in accordance with the monitoring requirements set forth in part 7 of these rules.

(2) Analytical results that are used to determine compliance with ~~the MCLs state~~ **drinking water standards** established in this part shall be performed by department or EPA-certified or provisionally certified laboratories, **except that measurements for alkalinity, bromide, calcium, daily chlorite samples at the entrance to the distribution system, conductivity, magnesium, orthophosphate, pH, residual disinfectant concentration, silica, specific ultraviolet absorbance, temperature, and turbidity may be performed by personnel acceptable to the department.**

R 325.10602 MCLs for total coliform bacteria.

Rule 602. All of the following provisions apply to the MCLs for total coliform bacteria for all public water supplies:

(a) For a water supply that collects 40 or more samples per month ~~pursuant to the provisions of~~ **under R 325.10705(2) and R 325.10706(2) to R 325.10707**, the supply is in compliance with the MCL for total coliforms if not more than 5.0% of the samples collected during a month are total coliform positive.

(b) For a water supply that collects less than 40 samples per month, the supply is in compliance with the MCL for total coliforms if not more than 1 sample collected during a month is total coliform positive.

(c) Any fecal coliform positive repeat sample, an E. coli positive repeat sample, or any total coliform positive repeat sample following a fecal coliform positive or E. coli positive routine sample constitutes a violation of the MCL for total coliforms.

(d) In addition to the requirements of subdivision (a) of this rule, the department may determine an MCL violation has occurred, and shall notify a ~~supplier of water~~ **supply**, when the concentration of positive total coliform samples in a portion of the water system constitutes a public health hazard.

(e) Samples that are collected to meet the repeat monitoring requirements of R 325.10707 are not considered special purpose samples and shall be used to determine compliance with the MCL for total coliform.

**(f) If a water supply collects some but not all required repeat samples under R 325.10707, then compliance with the MCL shall be based on the samples collected. If a supply collects none of the required repeat samples, then the supply is in violation of the MCL.**

R 325.10604c MCL for inorganic chemicals.

Rule 604c. (1) Except as specified, the maximum contaminant levels and effective dates for inorganic chemicals in table 1 of this rule apply to community ~~water~~ and nontransient

noncommunity water supplies. **These public water supplies are considered "water supplies" or "supplies" in this rule.**

Table 1 MCLs for inorganic chemicals

Contaminant	Maximum Contaminant Level in mg/l	Effective Date
Antimony	0.006	January 17, 1994.
Arsenic <sup>4</sup>	0.010	<del>[effective date of this rule]</del> <b>April 6, 2005.</b>
Asbestos	7 million fibers per liter (longer than 10 um)	July 30, 1992.
Barium	2	January 1, 1993.
Beryllium	0.004	January 17, 1994.
Cadmium	0.005	July 30, 1992.
Chromium	0.1	July 30, 1992.
Cyanide (as free cyanide)	0.2	January 17, 1994.
Fluoride <sup>21</sup>	4	October 2, 1987.
Mercury	0.002	July 30, 1992.
Nickel	MCL withdrawn	May 30, 2002
Nitrate (as Nitrogen) <sup>32</sup>	10	July 30, 1992.
Nitrite (as Nitrogen) <sup>32</sup>	1	July 30, 1992.
Total Nitrate and Nitrite (as Nitrogen) <sup>3</sup>	10	July 30, 1992.
Selenium	0.05	July 30, 1992.
Thallium	0.002	January 17, 1994.

~~<sup>4</sup> The MCL of 0.010 mg/l is effective for compliance purposes on January 23, 2006 for community and nontransient noncommunity water supplies. Until January 23, 2006, the MCL of 0.05 mg/l applies only to community water supplies. Sampling results shall be reported to the nearest 0.001 mg/l beginning January 23, 2006. After January 23, 2006 this footnote no longer applies.~~

~~<sup>2-1</sup> The MCL and effective date apply to only community water supplies.~~

~~<sup>3-2</sup> The MCLs and effective dates apply to community and noncommunity water supplies.~~

(2) Compliance with the MCL requirements of this rule shall be determined based on the analytical results that are obtained at each sampling point as specified in R 325.10710. If 1 sampling point is in violation of an MCL, then the **water** supply is in violation of the MCL. All of the following provisions apply:

(a) For supplies monitoring more than once per year, compliance with the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, or thallium is determined by a running annual average at each sampling point.

(b) Supplies monitoring annually or less frequently whose sample result exceeds the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, or thallium shall begin quarterly sampling. Compliance with the MCL shall be based on the running annual average. For the purpose of calculating the running annual average, the initial exceedance shall be considered the result for the first quarter. If the department requires a confirmation sample under R 325.10710(9), then the average of the initial exceedance and the confirmation sample shall be considered the result for the first quarter. The supply shall not be considered in violation of the MCL until it has completed 1 year of quarterly sampling.

(c) If any sample result causes the running annual average to exceed the MCL at any sampling point, then the supply is out of compliance with the MCL immediately.

(d) If a supply fails to collect the required number of samples, then compliance shall be based on the total number of samples collected.

(e) If a sample result is less than the detection limit, then zero shall be used to calculate the annual average.

(f) Compliance with the MCLs for nitrate and nitrite is determined based on 1 sample if the levels of these contaminants are below the MCLs. If the level of nitrate or nitrite or the combination of nitrate and nitrite is more than the MCLs in the initial sample, then a confirmation sample is required under R 325.10710(9)(b) and (c), and compliance shall be determined based on the average of the initial and confirmation samples.

(3) The department may allow nitrate levels above 10 milligrams per liter but not more than 20 milligrams per liter in a noncommunity water supply if the supply demonstrates, to the satisfaction of the department, all of the following:

(a) A permanent alternate source of water meeting state drinking water standards can not be obtained.

(b) The water will not be available to children under 6 months of age.

(c) Water meeting state drinking water standards, such as bottled water, will be provided to those who request it.

(d) There is continuous posting at all drinking water outlets available to the public that nitrate levels exceed 10 mg/l and the potential health effects of exposure as specified in part 4 of these rules.

(e) Adverse health effects are not documented.

R 325.10604f Treatment techniques for lead and copper.

Rule 604f. (1) Treatment techniques for lead and copper are as follows:

~~(a) The requirements of this rule constitute the drinking water standards for lead and copper. Unless otherwise indicated, this rule applies to community water systems and nontransient, noncommunity water systems.~~ **This rule, R 325.10410 and R 325.10710a to R 325.10710d are the requirements for lead and copper and apply to community and nontransient noncommunity water supplies. These public water supplies are considered "water supplies" or "supplies" in this rule, R 325.10410 and R 325.10710a to R 325.10710d.**

~~(b) These regulations~~ **rules** establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples that are collected at consumers' taps.

(c) The lead action level is exceeded if the ninetieth percentile lead level is more than 0.015 milligrams per liter (mg/l) in tap water samples collected during a monitoring period conducted under R 325.10710a. The copper action level is exceeded if the ninetieth percentile copper level is more than 1.3 mg/l in tap water samples collected during a monitoring period conducted under R 325.10710a.

The ninetieth percentile lead and copper levels shall be computed as follows:

(i) The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(ii) The number of samples taken during the monitoring period shall be multiplied by 0.9.

(iii) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (ii) of this subdivision is the ninetieth percentile contaminant level.

(iv) If a total of 5 samples are collected per monitoring period, the ninetieth percentile is computed by taking the average of the highest and second highest concentrations. ~~If fewer~~

~~than 5 samples are collected, the ninetieth percentile is the highest concentration in 1 sample for purposes of this rule.~~

**(v) For a water supply that has been allowed by the department to collect fewer than 5 samples under R 325.10710a(3), the sample result with the highest concentration is considered the 90th percentile value.**

(d) A ~~supplier~~**supply** shall install and operate optimal corrosion control treatment on the system under subrules (2) and (3) of this rule. A ~~system~~**supply** that is in compliance with the applicable corrosion control treatment requirements specified by the department under subrules (2) and (3) of this rule is in compliance with the treatment requirement.

(e) ~~If a system exceeds~~ **A supply exceeding** the lead or copper action level, ~~the supplier~~ shall implement all applicable source water treatment requirements specified by the department under subrule (4) of this rule.

(f) ~~If a system exceeds~~ **A supply exceeding** the lead action level after implementation of applicable corrosion control and source water treatment requirements, ~~the supplier~~ shall complete the lead service line replacement requirements contained in subrule (5) of this rule.

(g) **Under R 325.10410, all water supplies shall provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested. A supply exceeding the lead action level** ~~If a system exceeds the lead action level, the supplier~~ shall implement the public education requirements specified in R 325.10410.

(h) Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subrule shall be completed ~~pursuant to~~ **under** R 325.10605, R 325.10710a, R 325.10710b, and R 325.10710c.

(i) A ~~supplier~~**supply** shall report, to the department, the information required by the treatment provisions of this subrule and R 325.10710d.

(j) A ~~supplier~~**supply** shall maintain records under R 325.11506(1)(e).

(k) Failure to comply with the applicable requirements of this rule, R 325.10410, R 325.10710a, R 325.10710b, R 325.10710c, R 325.10605, R 325.10710d, and R 325.11506(1)(e) constitutes a violation of ~~the drinking water standards~~ **these rules** for lead or copper, as applicable.

(2) Corrosion control treatment steps apply to small, medium size, and large water ~~systems~~**supplies** as follows:

(a) A ~~supplier~~**supply** shall complete the applicable corrosion control treatment requirements described in subrule (3) of this rule by the deadlines established in this rule. ~~The supplier of a~~ **A large water system supply** (serving more than 50,000 persons) shall complete the corrosion control treatment steps specified in subdivision (d) of this subrule, unless the ~~supplier~~**supply** is considered to have optimized corrosion control under subdivision (b)(ii) or (iii) of this subrule. ~~The supplier of a~~ **A small water system** (serving 3,300 or fewer persons) ~~or and~~ **a medium size water system** (serving more than 3,300, but fewer than 50,001 persons) shall complete the corrosion control treatment steps specified in subdivision (e) of this subrule unless the ~~supplier~~**supply** is considered to have optimized corrosion control under subdivision (b)(i), (ii), or (iii) of this subrule.

(b) A ~~supplier~~**supply** is considered to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in subrule (3) of this rule if the ~~system~~**supply** is in compliance with 1 of the criteria specified in paragraphs (i) through (iii) of this subdivision. A ~~supplier~~**supply** which is considered to have optimized corrosion control under this subdivision and which has treatment in place shall continue to operate and maintain optimal corrosion control treatment and meet the requirements that the department determines appropriate to ensure optimal corrosion

control treatment is maintained. All of the following provisions apply to being considered to have optimized corrosion control:

(i) A ~~supplier of a~~ small or medium size water ~~system~~ **supply** is considered to have optimized corrosion control if the ~~system~~ **supply** is in compliance with the lead and copper action levels during each of 2 consecutive 6 month monitoring periods during which monitoring is conducted under R 325.10710a.

(ii) A ~~supplier~~ **water supply** may be considered by the department to have optimized corrosion control treatment if the ~~supplier~~ **supply** demonstrates, to the satisfaction of the department, that it has conducted activities equivalent to the corrosion control steps applicable to the system under subrule (3) of this rule. ~~Suppliers~~ **Supplies** considered to have optimized corrosion control under this subdivision shall operate in compliance with the department designated optimal water quality control parameters under subrule (3)(f) of this rule and continue to conduct lead and copper tap and water quality parameter sampling under R 325.10710a(4)(c) and R 325.10710b(4), respectively. A ~~supplier~~ **supply** shall provide the department with all of the following information to support a determination under this subdivision:

(A) The results of all test samples collected for each of the water quality parameters specified in subrule (3)(c)(iii) of this rule.

(B) A report that explains the test methods used by the ~~supplier~~ **water supply** to evaluate the corrosion control treatments listed in subrule (3) of this rule, the results of all tests conducted, and the basis for the ~~supplier's~~ **supply's** selection of optimal corrosion control treatment.

(C) A report that explains how corrosion control has been installed and how it is being maintained to ensure minimal lead and copper concentrations at consumers' taps.

(D) The results of tap water samples collected under R 325.10710a at least once every 6 months for 1 year after corrosion control has been installed.

(iii) A ~~supplier~~ **water supply** is considered to have optimized corrosion control ~~for the system~~ if it submits results of tap water monitoring conducted under R 325.10710a and source water monitoring conducted under R 325.10710c that demonstrates, for 2 consecutive 6 month monitoring periods, that the difference between the ninetieth percentile tap water lead level computed under subrule (1)(c) of this rule and the highest source water lead concentration is less than the practical quantitation level for lead. In addition, all of the following provisions apply:

(A) A ~~supplier of a system where the~~ **supply whose** highest source water lead level is below the method detection limit is considered to have optimized corrosion control under this paragraph if the ~~system's~~ **supply's** ninetieth percentile tap water lead level is less than or equal to the practical quantitation level for lead for 2 consecutive 6 month monitoring periods.

(B) A ~~supplier~~ **water supply** considered to have optimized corrosion control under this paragraph shall continue monitoring for lead and copper at the tap not less frequently than once every 3 calendar years using the reduced number of sites specified in R 325.10710a(3) and collecting the samples at times and locations specified in R 325.10710a(4)(d)(iv).

(C) A ~~supplier~~ **water supply** considered to have optimized corrosion control ~~pursuant to~~ **under** this subdivision shall notify the department, in writing, ~~pursuant to~~ **under** R 325.10710d(a)(iii) of a **upcoming long-term** change in treatment or the addition of a new source **as described in that subdivision. The department shall review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water supply.** The department may require the ~~supplier~~ **supply** to conduct additional monitoring or to take other action the department considers appropriate

consistent with the requirements of R 325.10604f(2) to ensure that the ~~supplier~~ **supply** maintains minimal levels of corrosion in the distribution system.

(D) As of July 12, 2001, a ~~supplier~~ **supply** is not considered to have optimized corrosion control under this subdivision, and shall implement corrosion control treatment ~~pursuant to~~ **under** subparagraph (E) of this paragraph unless it meets the copper action level.

(E) A ~~supplier~~ **supply** that is no longer considered to have optimized corrosion control under this subdivision shall implement corrosion control treatment under the deadlines in subdivision (e) of this subrule. ~~The supplier of a~~ **A large water system supply** shall adhere to the schedule specified in that subdivision for medium size water ~~systems~~ **supplies**, with the time periods for completing each step being triggered by the date the ~~supplier~~ **supply** is no longer considered to have optimized corrosion control under this subdivision.

(c) If a small or medium size water ~~system~~ **supply** exceeds the lead or copper action level and the ~~supplier~~ **supply** is required to perform the corrosion control treatment steps, the ~~supplier~~ **supply** may cease completing the treatment steps when the ~~system~~ **supply** is in compliance with both action levels during each of 2 consecutive monitoring periods conducted under R 325.10710a and the ~~supplier~~ **supply** submits the results to the department. If the ~~system~~ **supply** thereafter exceeds the lead or copper action level during a monitoring period, the ~~supplier~~ **supply** shall recommence the applicable treatment steps beginning with the first treatment step that was not previously completed in its entirety. The department may require a ~~supplier~~ **supply** to repeat treatment steps that were previously completed by the ~~supplier~~ **supply** if the department determines that this is necessary to properly implement the treatment requirements of this rule. **The department shall notify the supply in writing of the determination and explain the basis of the decision.** If a small or medium size water ~~system~~ **supply** exceeds the lead or copper action level, the ~~supplier~~ **supply**, including ~~suppliers~~ **supplies** considered to have optimized corrosion control under subdivision (b) of this subrule, shall implement corrosion control treatment steps under subdivision (e) of this subrule.

(d) Except as provided in subdivisions (b)(ii) and (iii) of this subrule, a ~~supplier of a~~ large water ~~system~~ **supply** shall complete all of the following corrosion control treatment steps by the indicated dates:

(i) Step 1: A ~~supplier~~ **supply** shall conduct initial monitoring during 2 consecutive 6 month monitoring periods by January 1, 1993.

(ii) Step 2: A ~~supplier~~ **supply** shall complete corrosion control studies by July 1, 1994.

(iii) Step 3: By January 1, 1997, a ~~supplier~~ **supply** shall install optimal corrosion control treatment as designated by the department.

(iv) Step 4: A ~~supplier~~ **supply** shall complete follow up sampling by January 1, 1998.

(v) Step 5: A ~~supplier~~ **supply** shall operate in compliance with the department specified optimal water quality control parameters and continue to conduct tap sampling.

(e) Except as provided in subdivision (b) of this subrule, ~~the suppliers of~~ small and medium size water ~~systems~~ **supplies** shall complete all of the following corrosion control treatment steps by the indicated time periods:

(i) Step 1: A ~~supplier~~ **supply** shall conduct initial tap sampling **under R 325.10604f(3)(a)** until the ~~system~~ **supply** either exceeds the lead or copper action level or becomes eligible for reduced monitoring. ~~The supplier of a~~ **system supply** that exceeds the lead or copper action level shall recommend optimal corrosion control treatment within 6 months after the **end of the monitoring period during which it** ~~system~~ **exceeds 1 of the action levels.**

(ii) Step 2: Within 12 months after **the end of the monitoring period during which a supply** ~~a system~~ **exceeds the lead or copper action level**, the department may require the ~~supplier~~ **supply** to perform corrosion control studies **under subdivision (3)(b) of this rule.** **If the department does not require the supply to perform the studies, the department**

shall specify optimal corrosion control treatment under subdivision (3)(d) of this rule within the following timeframes:

(A) For medium-size supplies, within 18 months after the end of the monitoring period during which the supply exceeds the lead or copper action level.

(B) For small supplies, within 24 months after the end of the monitoring period during which the supply exceeds the lead or copper action level.

(iii) Step 3: If the department requires a ~~supplier~~**supply** to perform corrosion control studies **under subdivision (3)(b) of this rule**, the ~~supplier~~**supply** shall complete the studies within 18 months after the department requires that the studies be conducted. **If the supply has performed corrosion control studies under paragraph (ii) of this subdivision, the department shall designate optimal corrosion control treatment under subdivision (3)(d) of this rule within 6 months after completion of the corrosion control studies.**

(iv) Step 4: A ~~supplier~~**supply** shall install optimal corrosion control treatment within 24 months after the department designates the treatment.

(v) Step 5: A ~~supplier~~**supply** shall complete follow up sampling **under R 325.10710a(4)(b)** within 36 months after the department designates optimal corrosion control treatment. **The department shall review the supply's installation of treatment and designate optimal water quality control parameters under R 325.10604f(3)(d)(ii) within 6 months after the supply's completion of follow-up sampling.**

(vi) Step 6: A ~~supplier~~**supply** shall operate in compliance with the department designated optimal water quality control parameters **under R 325.10604f(3)(d)(ii)** and continue to conduct tap sampling **under R 325.10710a(4)(c) and R 325.10710b(6).**

(3) A ~~supplier~~**water supply** shall complete all the corrosion control treatment requirements described in this subrule that are applicable to the system under subrule (2) of this rule:

(a) Based on the results of lead and copper tap monitoring and water quality parameter monitoring, ~~the suppliers of~~ small and medium size water systems that exceed the lead or copper action level shall recommend the installation of 1 or more of the corrosion control treatments listed in subdivision (c)(i) of this subrule that the ~~supplier~~**supply** believes constitutes optimal corrosion control for that system. The department may require the ~~supplier~~**supply** to conduct additional water quality parameter monitoring under R 325.10710b(4) to assist the department in reviewing the ~~supplier's~~**supply's** recommendation.

(b) When required by the department, ~~the supplier of~~ a small or medium size water system ~~system~~**supply** that exceeds the lead or copper action level shall perform corrosion control studies under subdivision (c) of this subrule to identify optimal corrosion control treatment for the ~~system~~**supply**.

(c) Perform corrosion control studies as follows:

(i) A ~~supplier~~**water supply** that performs corrosion control studies shall evaluate the effectiveness of each of the following treatments and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that ~~system~~**supply**:

(A) Alkalinity and pH adjustment.

(B) Calcium hardness adjustment.

(C) The addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(ii) The ~~supplier~~**water supply** shall evaluate each of the corrosion control treatments using pipe rig/loop tests, metal coupon tests, partial system tests, or analyses based on documented analogous treatments with other ~~systems~~**water supplies** of similar size, water chemistry, and distribution system configuration.



(iii) A ~~supplier~~**water supply** shall measure all of the following water quality parameters in tests conducted under this paragraph before and after evaluating the corrosion control treatments listed in paragraph (i)(A) to (C) of this subdivision:

- (A) Lead.
- (B) Copper.
- (C) pH.
- (D) Alkalinity.
- (E) Calcium.
- (F) Conductivity.
- (G) Orthophosphate, when an inhibitor containing a phosphate compound is used.
- (H) Silicate, when an inhibitor containing a silicate compound is used.
- (I) Water temperature.

(iv) The ~~supplier~~**water supply** shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and shall document the constraints with 1 or both of the following:

(A) Data and documentation demonstrating that a particular corrosion control treatment has adversely affected other water treatment processes when used by another ~~system~~**water supply** with comparable water quality characteristics.

(B) Data and documentation demonstrating that the ~~supplier~~**supply** has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

(v) A ~~supplier~~**water supply** shall evaluate the effect of the chemicals used for corrosion control treatment in other water quality treatment processes.

(vi) On the basis of an analysis of the data generated during each evaluation, a ~~supplier~~**water supply** shall recommend, to the department, in writing, the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that ~~system~~**supply**. The ~~supplier~~**water system** shall provide a rationale for its recommendation together with all supporting documentation specified in paragraphs (i) to (v) of this subdivision.

(d) Department designation of optimal corrosion control treatment shall be as follows:

(i) Based on consideration of available information, including, where applicable, studies performed under subdivision (c) of this subrule and a ~~supplier's~~**supply's** recommended treatment alternative, the department will either approve the corrosion control treatment option recommended by the ~~supplier~~**supply** or will designate alternative corrosion control treatment from the treatment specified in subdivision (c)(i) of this subrule. When designating optimal treatment, the department shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(ii) **The department shall notify the supply of its decision on optimal corrosion control treatment in writing and explain the basis for this determination.** If the department requests additional information to aid its review, the ~~supplier~~**water supply** shall provide the information.

(e) Each ~~supplier~~**supply** shall properly install and operate, throughout its distribution system, the optimal corrosion control treatment designated by the department.

**(f) The department shall evaluate the results of all lead and copper tap samples and water quality control parameter samples submitted by the water supply and determine whether the supply has properly installed and operated the optimal corrosion control treatment designated by the department in subdivision (d) of this subrule. Upon reviewing the results of tap water and water quality control parameter monitoring by the supply, both before and after the supply installs optimal corrosion control treatment, the department shall designate all of the following:**

(i) A minimum value or a range of values for pH measured at each entry point to the distribution system.

(ii) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system, that the department determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system.

(iii) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system.

The department may designate values for additional water quality control parameters determined by the department to reflect optimal corrosion control for the supply. The department shall notify the supply in writing of these determinations and explain the basis for its decision.

~~(f)~~ **(g)** All ~~suppliers~~ **supplies** optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the department, under this subdivision for all samples collected under R 325.10710b(6) through (8). Compliance with the requirements of this subdivision shall be determined every 6 months, as specified under R 325.10710b(6). A ~~system-water system~~ is out of compliance with the requirements of this subdivision for a 6 month period if it has excursions for a department specified parameter on more than 9 days during the period. An excursion occurs when the daily value for 1 or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the department. The department may delete results of obvious sampling errors from this calculation. Daily values are calculated as follows:

(i) On days when more than 1 measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both.

(ii) On days when only 1 measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

(iii) On days when a measurement is not collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

~~(g)~~ **(h)** The department's determination of the optimal corrosion control treatment specified in subdivision (d) of this subrule or optimal water quality control parameters may be modified by the department. If a request for modification is by a ~~supplier~~ **supply** or other interested person, the request shall be in writing, shall explain why the modification is appropriate, and shall provide supporting documentation. The department may modify its determination where it concludes that a change is necessary to ensure that the ~~supplier~~ **supply** continues to optimize corrosion control treatment.

(4) A ~~supplier~~ **water supply** shall complete the applicable source water monitoring and treatment requirements by the following deadlines:

(a) The deadlines for completing source water treatment steps are as follows:

(i) Step 1: ~~The supplier of a system that exceeds~~ **A supply exceeding** the lead or copper action level shall complete lead and copper source water monitoring **under R 325.10710c(2)** and make a treatment recommendation to the department **under paragraph (b)(i) of this subdivision** ~~within 6 months after the end of the monitoring period during which exceeding the lead or copper action level was exceeded.~~ **The department shall make a determination regarding source water treatment under paragraph (4)(b)(ii) of**

**this subdivision within 6 months after submission of monitoring results under this paragraph.**

(ii) Step 2: If the department requires installation of source water treatment, the ~~supplier~~ **supply** shall install the treatment within 24 months after the date of written notification by the department **under paragraph (i) of this subdivision.**

(iii) Step 3: The ~~supplier-supply~~ shall complete follow up tap water monitoring **under R 325.10710a(4)(b)** and source water monitoring **under R 325.10710c(3)** within 36 months after the date of written notification by the department **under paragraph (i) of this subdivision. The department shall review the supply's installation and operation of source water treatment and specify maximum permissible source water levels under R 325.10604f(4)(b)(iv) within 6 months after completion of the follow up tap water monitoring and source water monitoring of this paragraph.**

(iv) Step 4: A ~~supplier-supply~~ shall operate a ~~system~~ in compliance with the department specified maximum permissible lead and copper source water levels and shall continue source water monitoring.

(b) Source water treatment requirements are as follows:

(i) ~~The supplier of a~~ **A** system that exceeds the lead or copper action level shall recommend, in writing, to the department, the installation and operation of 1 of the source water treatments listed in paragraph (ii) of this subdivision. A ~~supplier-supply~~ may recommend that no treatment be installed based on a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

(ii) **The department shall complete an evaluation of the results of all source water samples submitted by the supply to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps.** If the department determines that source water treatment is needed to minimize lead or copper levels in water that is delivered to users' taps, the department will either require installation and operation of the source water treatment recommended by the ~~supplier-supply~~ or require the installation and operation of another source water treatment from among the following alternatives:

- (A) Ion exchange.
- (B) Reverse osmosis.
- (C) Lime softening.
- (D) Coagulation/filtration.

If the department requests additional information to aid in its review, the ~~supplier-water~~ **supply** shall provide the information by the date specified by the department in its request. **The department shall notify the supply in writing of its determination and set forth the basis for its decision.**

(iii) ~~A supplier-~~ **Each supply** shall properly install and operate the source water treatment designated by the department under paragraph (ii) of this subdivision. **The department shall review the source water samples taken by the supply both before and after the supply installs source water treatment, and determine whether the supply has properly installed and operated the source water treatment designated by the department.**

(iv) **Based on the department's review of the source water treatment, the department shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. These levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The department shall notify the supply in writing and explain the basis for its decision.** ~~A supplier-~~ **Each water supply** shall maintain lead and copper levels below the maximum permissible concentrations designated by the department at each sampling point monitored under R 325.10710c. A ~~system-supply~~ is out of compliance with this subrule if

the level of lead or copper at a sampling point is more than the maximum permissible concentration designated by the department.

(v) Upon its own initiative or in response to a request by a ~~supplier~~ **water supply** or other interested person, the department may modify its determination of the source water treatment or maximum permissible lead and copper concentrations for finished water entering the distribution system. A request for modification by a ~~supplier~~ **supply** or other interested person shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The department may modify its determination where it concludes that a change is necessary to ensure that the ~~supplier~~ **supply** continues to minimize lead and copper concentrations in source water. **A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the department's decision, and provide an implementation schedule for completing the treatment modifications.**

(5) Lead service line replacement requirements are as follows:

(a) A ~~supplier of a system~~ **water supply** that exceeds the lead action level in tap samples taken pursuant to ~~under~~ R 325.10710a(4)(b) after installing corrosion control or source water treatment, or both, whichever sampling occurs later, shall replace lead service lines under the requirements of this subrule. If a ~~supplier~~ **supply** is in violation of subrule (2) or (4) of this rule for failure to install source water or corrosion control treatment, then the department may require the ~~supplier~~ **supply** to commence lead service line replacement after the date that the ~~supplier~~ **supply** was required to conduct monitoring under R 325.10710a(4)(b).

(b) **Both of the following apply to the schedule of lead service line replacement:**

(i) Annually, a ~~supplier~~ **water supply** shall replace not less than 7% of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place when the replacement program begins. The ~~supplier~~ **supply** shall identify the initial number of lead service lines in its distribution system, including an identification of the portion or portions owned by the system, based on a materials evaluation, including the evaluation required under R 325.10710a(1) and relevant legal authorities, for example, contracts and local ordinances, regarding the portion owned by the system. The first year of lead service line replacement shall begin on the ~~date that~~ **first day following the end of the monitoring period in which** the action level was exceeded in tap sampling referenced in subdivision (a) of this subrule. **If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the department has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.**

(ii) A water supply resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by subdivision (e) of this subrule shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under subdivision (c) of this subrule. The supply will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that shall be replaced per year. The 7 percent lead service line replacement is based on a 15-year replacement program, so, for example, supplies resuming lead service line replacement after previously conducting 2 years of replacement would divide the updated inventory by 13. For those supplies that have completed a 15-year lead service line replacement program, the department will determine a schedule for replacing or retesting lines that were previously tested out under the replacement program when the supply re-exceeds the action level.

(c) A ~~supplier~~**water supply** is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken under R 325.10710a(2)(c), is less than or equal to 0.015 mg/l.

(d) A ~~supplier~~**water supply** shall replace that portion of the lead service line that ~~the system~~**it** owns. If the ~~system~~**supply** does not own the entire lead service line, the ~~supplier~~**supply** shall notify the owner of the line, or the owner's authorized agent, that the ~~supplier~~**supply** will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A ~~supplier~~**supply** is not required to bear the cost of replacing the privately owned portion of the line, nor is it required to replace the privately owned portion where the owner chooses not to pay the cost of replacing the privately owned portion of the line, or where replacing the privately owned portion would be precluded by state, local, or common law. A ~~supplier~~**water supply** that does not replace the entire length of the service line also shall complete both of the following tasks:

(i) Not less than 45 days before commencing with the partial replacement of a lead service line, the ~~supplier~~**water system** shall provide notice to the resident or residents of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The ~~supplier~~**water supply** may provide notice under the previous sentence less than 45 days before commencing partial lead service line replacement where the replacement is in conjunction with emergency repairs. In addition, the ~~supplier~~**water supply** shall inform the resident or residents served by the line that the ~~supplier~~**supply** will, at the ~~supplier's~~**supply's** expense, collect a sample from each partially replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under R 325.10710a(2)(c), within 72 hours after the completion of the partial replacement of the service line. The ~~supplier~~**supply** shall collect the sample and report the results of the analysis to the owner and the resident or residents served by the line within 3 business days of receiving the results. Mailed notices postmarked within 3 business days of receiving the results are satisfactory.

(ii) The ~~supplier~~**water supply** shall provide the information required by paragraph (i) of this subdivision to the residents of individual dwellings by mail or by other methods approved by the department. If multifamily dwellings are served by the line, the ~~supplier~~**supply** shall have the option to post the information at a conspicuous location.

(e) **A water supply shall replace lead service lines on a shorter schedule than that required by this subrule, if directed by the department. The department shall take into account the number of lead service lines in the system, where a shorter replacement schedule is feasible. The department shall make this determination in writing and notify the supply of its finding within 6 months after the supply is triggered into lead service line replacement based on monitoring referenced in subdivision (a) of this subrule.**

(f) A ~~supplier~~**supply** may cease replacing lead service lines when first draw samples collected under R 325.10710a(2)(b) meet the lead action level during each of 2 consecutive monitoring periods and the ~~supplier~~**supply** submits the results to the department. If the first draw samples thereafter exceed the lead action level, the ~~supplier~~**supply** shall recommence replacing lead service lines under subdivision (b)(ii) of this subrule.

~~(f)-(g)~~ To demonstrate compliance with subdivisions (a) to (d) of this subrule, a ~~supplier~~**supply** shall report the information specified in R 325.10710d(e) to the department.

R 325.10605 Analytical techniques and sample collection procedures; incorporation by reference.

Rule 605. The analytical techniques and sample collection procedures used in the determination of compliance with the state drinking water standards for microbiological

contaminants, **fecal indicators**, inorganic chemical contaminants, organic chemical contaminants, including maximum TTHM potential, turbidity, residual disinfectants, disinfection byproducts, disinfection byproduct precursors, temperature, pH, conductivity, alkalinity, **bromide, specific ultraviolet absorbance, total organic carbon**, and radioactivity which are contained in 40 CFR parts 141 and 143, (2004, 2003, 2002, 2001, **2008, 2007, 2006**), and which have been promulgated by the United States EPA under authority of the safe drinking water act of 1974 (public law 93-523), the safe drinking water act amendments of 1986 (public law 99-339), and the safe drinking water act amendments of 1996 (public law 104-182), 42 USC 300f et seq. are adopted by reference in these rules. The adopted material is available from the superintendent of documents at the address in R 325.10116(b) for a cost of \$61.00 at the time of adoption of these rules. The adopted material is available for inspection, or copies are available at no cost from the offices of the department at the address in R 325.10116(a).

R 325.10610 MCLs for disinfection byproducts.

Rule 610. (1) **Both of the following apply to bromate and chlorite:**

(a) The maximum contaminant levels (MCLs) for ~~disinfection byproducts~~ **bromate and chlorite** are as follows:

Disinfection byproduct	MCL (mg/l)
Total trihalomethanes (TTHM)	0.080
Haloacetic acids (five) (HAA5)	0.060
Bromate	0.010
Chlorite	1.0

(b) The best available technologies, treatment techniques, or other means available for achieving compliance with the MCLs are as follows:

Disinfection byproduct	Best available technology.
Bromate	Control of ozone treatment process to reduce production of bromate.
Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

(2) This rule, R 325.10610a, R 325.10610b, R 325.10610c, R 325.10719e, and R 325.10719f apply to community and nontransient noncommunity water systems that add a chemical disinfectant to the water in any part of the drinking water treatment process and to transient noncommunity water systems adding chlorine dioxide. Transient noncommunity water systems are only required to comply with the chlorine dioxide requirements. **All of the following apply to total trihalomethanes and haloacetic acids:**

(a) The MCLs for TTHM and HAA5 are as follows:

Disinfection byproduct	MCL (mg/L)
Total trihalomethanes (TTHM) *	0.080
Haloacetic acids (five) (HAA5) *	0.060

\* Water supplies shall comply with the TTHM and HAA5 MCLs as a running annual average until the date specified in R 325.10610d(3). Supplies shall comply with the TTHM and HAA5 MCLs as a locational running annual average at each

monitoring location beginning the date specified for compliance in R 325.10610d(3).

(b) The best available technologies, treatment techniques, or other means available for achieving compliance with the MCLs under subdivision (a) of this subrule based on a running annual average under R 325.10610b and for achieving compliance with the MCLs based on a locational running annual average under R 325.10610d are as follows:

Disinfection byproduct	Best available technology for compliance with running annual average	Best available technology for compliance with locational running annual average
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5).	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant	Enhanced coagulation or enhanced softening, plus GAC10; or nanofiltration with a molecular weight cutoff less than or equal to 1000 Daltons; or GAC20

(c) The best technology, treatment techniques, or other means available for achieving compliance with the MCLs under subdivision (a) of this subrule as a locational running annual average under R 325.10610d for consecutive supplies are as follows and applies only to the disinfected water that consecutive supplies buy or otherwise receive.

Disinfection byproduct	Best available technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5).	Supplies serving 10,000 or more people: Improved distribution system and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance.  Supplies serving fewer than 10,000 people: Improved distribution system and storage tank management to reduce residence time

R 325.10610a Maximum residual disinfectant levels.

Rule 610a. (1) Maximum residual disinfectant levels (MRDLS) are as follows:

Disinfectant residual	MRDL (mg/l)
Chlorine	4.0 as chlorine
Chloramines	4.0 as chlorine
Chlorine dioxide	0.8 as chlorine dioxide

(2) ~~This rule applies as specified in R 325.10610(2)~~ **The best available technologies, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels under subrule (1) of this rule are control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.**

(3) ~~Suppliers may increase residual disinfectant levels in the distribution system of chlorine or chloramines, but shall not increase the levels of chlorine dioxide, to a level and~~

~~for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run off events, source water contamination events, or cross connection events.~~

R 325.10610b Disinfectant residuals, disinfection byproducts, and disinfection byproduct precursors; compliance requirements.

**Rule 610b.** (1) ~~This rule applies as specified in R 325.10610(2).~~ **This rule, R 325.10610c, R 325.10719e, and R 325.10719f apply to community water supplies and nontransient noncommunity water supplies that add a chemical disinfectant to the water in any part of the drinking water treatment process and to transient noncommunity water supplies adding chlorine dioxide. These public water supplies are considered "water supplies" or "supplies" in this rule. Transient noncommunity water supplies are only required to comply with the chlorine dioxide requirements.**

Compliance with this rule is based on all of the following:

(a) ~~All samples taken and analyzed under R 325.10605, R 325.10610, R 325.610a,~~ **under this rule, R 325.10610c, R 325.10719e, and R 325.10719f and analyzed under R 325.10605,** shall be included in determining compliance.

(b) If, during the first year of monitoring under R 325.10719e, any individual quarter's average will cause the running annual average of that ~~system-water supply~~ to exceed the **MCL for total trihalomethanes, haloacetic acids (five), or bromate; or the MRDL for chlorine or chloramine,** the ~~system-supply~~ is out of compliance at the end of that quarter.

(c) A ~~system-supply~~ is in violation of the state drinking water standard if compliance is based on 4 consecutive quarters of monitoring and the average of samples, or quarterly averages, or running annual averages, whichever is applicable, exceeds the state drinking water standard, unless otherwise noted in this rule.

(d) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the ~~supplier-supply~~ fails to complete 4 consecutive quarters or 12 consecutive months of monitoring, whichever is applicable, compliance with the MCL for the last 4 quarter compliance period is based on an average of the available data unless otherwise stated in this rule.

(2) Compliance with disinfection byproducts requirements is based on all of the following:

(a) Compliance with TTHM and HAA5 requirements are based on both of the following:

(i) For suppliers monitoring quarterly, compliance with MCLs in R 325.10610 is based on a running annual average, computed quarterly, of quarterly averages of all samples collected under R 325.10719e(2)(a).

(ii) For suppliers monitoring less frequently than quarterly, compliance is based on an average of samples taken that year under R 325.10719e(2)(a) if the average does not exceed the MCLs in R 325.10610. If the average of these samples exceeds the MCL, suppliers shall increase monitoring to once per quarter per treatment plant and the ~~system-supply~~ is not in violation of the MCL until it has completed 1 year of quarterly monitoring, unless the result of fewer than 4 quarters of monitoring will cause the running annual average to exceed the MCL, in which case the ~~system-supply~~ is in violation at the end of that quarter. Suppliers required to increase monitoring frequency to quarterly monitoring shall calculate compliance by including the sample which triggered the increased monitoring plus the following 3 quarters of monitoring.

(b) Compliance with the bromate requirements is based on a running annual average, computed quarterly, of monthly samples, or, for months in which the ~~system-supply~~ takes more than 1 sample, the average of all samples taken during the month, collected under R 325.10719e(2)(c).



(c) Compliance with the chlorite requirements is based on an average of each 3 sample set taken in the distribution system under R 325.10719e(2)(b)(i)(B) and R 325.10719e(2)(b)(ii). If the average of any 3 sample set exceeds the MCL, the ~~system~~ **supply** is in violation of the MCL.

(3) Compliance with disinfectant residuals requirements is based on both of the following:

(a) Compliance with the chlorine and chloramines requirements is based on a running annual average, computed quarterly, of monthly averages of all samples collected by the ~~system~~ **supply** under R 325.10719e(3)(a). In cases where ~~systems~~ **supplies** switch between the use of chlorine and chloramines for residual disinfection during the year, compliance is determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Suppliers shall clearly indicate which residual disinfectant was analyzed for each sample when submitting reports to the department under R 325.11502a.

(b) Compliance with the chlorine dioxide requirements is based on consecutive daily samples collected by the ~~system~~ **supply** under R 325.10719e(3)(b).

(i) A tier 1 violation occurs when a daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day 1, or more, of the 3 samples taken in the distribution system exceed the MRDL. The ~~supplier~~ **supply** shall take immediate corrective action to lower the level of chlorine dioxide below the MRDL. Failure to monitor in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also a tier 1 MRDL violation.

(ii) A tier 2 violation occurs when 2 consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL. The ~~supplier~~ **supply** shall take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also a tier 2 MRDL violation.

**(c) Notwithstanding the MRDLs in R 325.10610b, supplies may increase residual disinfectant levels in the distribution system of chlorine or chloramines, but shall not increase the levels of chlorine dioxide, to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run off events, source water contamination events, or cross connection events.**

(4) Compliance with the treatment technique for disinfection byproduct precursors (DBPP) is determined as specified by R 325.10610c(3). Suppliers may begin monitoring to determine whether step 1 TOC removals can be met 12 months before the compliance date for the ~~system~~ **supply**. This monitoring is not required and failure to monitor during this period is not a violation. However, a ~~supplier~~ **supply** that does not monitor during this period, and then determines, in the first 12 months after the compliance date, that the ~~system~~ **supply** is not able to meet the step 1 requirements in R 325.10610c(2)(b) and shall therefore apply for alternate minimum TOC removal (step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (step 2) requirements as allowed under R 325.10610c(2)(c) and is in violation. Suppliers may apply for alternate minimum TOC removal (step 2) requirements any time after the compliance date. For ~~systems~~ **supplies** required to meet step 1 TOC removals, if the value calculated under R 325.10610c(3)(a)(iv) is less than 1.00 calculated as a running annual average of monthly samples, computed quarterly, the ~~system~~ **supply** is in violation of the treatment technique requirements.

R 325.10610c Treatment technique for control of disinfection byproduct (DBP) precursors.

Rule 610c. (1) This rule applies as specified in R 325.10610(2) **to Subpart H supplies subject to R 325.10610b(1) that use conventional filtration. These public water supplies are considered "water supplies" or "supplies" in this rule.** Compliance with this rule is based on all of the following:

(a) ~~Suppliers of subpart H systems~~ using conventional filtration shall operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in subrule (2) of this rule unless the ~~system~~ **supply** meets at least 1 of the alternative compliance criteria listed in subdivision (b) or (c) of this subrule.

(b) ~~Suppliers of subpart H systems~~ using conventional filtration may use the following alternative compliance criteria to comply with this rule instead of complying with subrule (2) of this rule. ~~Suppliers of systems~~ using alternative compliance criteria shall still comply with TOC monitoring requirements in R 325.10719e(4):

(i) The ~~system's~~ **supply's** source water TOC level is less than 2.0 mg/l, calculated quarterly as a running annual average.

(ii) The ~~system's~~ **supply's** treated water TOC level is less than 2.0 mg/l, calculated quarterly as a running annual average.

(iii) The ~~system's~~ **supply's** source water TOC level is less than 4.0 mg/l, calculated quarterly as a running annual average; the source water alkalinity, measured under R 325.10605, is more than 60 mg/l as calcium carbonate, calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are not more than 0.040 mg/l and 0.030 mg/l, respectively, or before the effective date for compliance in R 325.10610(2), the ~~supplier~~ **supply** has made a clear and irrevocable financial commitment to use technologies that will limit the levels of TTHM and HAA5 to not more than 0.040 mg/l and 0.030 mg/l, respectively. Suppliers shall submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the department for approval not later than the effective date for compliance in R 325.10610(2). These technologies shall be installed and operating not later than June 30, 2005. Failure to install and operate these technologies by the date in the approved schedule is a violation of these rules.

(iv) The TTHM and HAA5 running annual averages are not more than 0.040 mg/l and 0.030 mg/l, respectively, and the ~~supplier~~ **supply** uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

(v) The ~~system's~~ **supply's** source water SUVA, before any treatment and measured monthly, is less than or equal to 2.0 liters per milligram meter (l/mg-m), calculated quarterly as a running annual average.

(vi) The ~~system's~~ **supply's** finished water SUVA, measured monthly, is less than or equal to 2.0 l/mg-m, calculated quarterly as a running annual average.

(c) ~~Suppliers of systems~~ **Water supplies** practicing enhanced softening that cannot achieve the TOC removals required by subrule (2)(b) of this rule may use the following alternative compliance criteria instead of complying with subrule (2) of this rule; however, ~~suppliers of systems~~ using alternative compliance criteria shall still comply with TOC monitoring requirements in R 325.10719e(4)(b):

(i) Softening that results in lowering the treated water alkalinity to less than 60 mg/l as calcium carbonate, measured monthly and calculated quarterly as a running annual average.

(ii) Softening that results in removing not less than 10 mg/l of magnesium hardness as calcium carbonate, measured monthly and calculated quarterly as an annual running average.

(2) All of the following provisions are enhanced coagulation and enhanced softening performance requirements:

(a) ~~Suppliers~~ **Water supplies** shall achieve the percent reduction of TOC specified in subdivision (b) of this subrule between the source water and the combined filter effluent, unless the department approves a ~~supplier's~~ **supply's** request for alternate minimum TOC removal (step 2) requirements under subdivision (c) of this subrule.

(b) Required step 1 TOC reductions, indicated in table 1 of this rule, are based on specified source water parameters. Suppliers practicing softening are required to meet the step 1 TOC reductions in the far-right column "source water alkalinity >120 mg/l" for the specified source water TOC.

Table 1 Step 1 required removal of TOC by enhanced coagulation and enhanced softening for subpart H ~~systems~~ **supplies** using conventional filtration <sup>A, B</sup>

Source-water TOC, mg/l	Source-water alkalinity, mg/l as calcium carbonate		
	0-60	>60-120	>120C
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

<sup>A</sup> Suppliers meeting at least 1 of the conditions in subrule (1)(b)(i) through (vi) of this rule are not required to operate with enhanced coagulation.

<sup>B</sup> Suppliers ~~of~~ **with** softening systems meeting 1 of the alternative compliance criteria in subrule (1)(c) of this rule are not required to operate with enhanced softening.

<sup>C</sup> Suppliers practicing softening shall meet the TOC removal requirements in this column.

(c) ~~Suppliers of~~ subpart H **supplies using** conventional filtration systems that cannot achieve the step 1 TOC removals required by subdivision (b) of this subrule due to water quality parameters or operational constraints shall apply to the department, within 3 months of failure to achieve the TOC removals required by subdivision (b) of this subrule, for approval of alternative minimum TOC removal (step 2) requirements submitted by the ~~system~~ **supply**. If the department approves the step 2 requirements, then a ~~system's~~ **supply's** failure to meet the step 1 TOC removals will not be considered a treatment technique violation during the interim time period between the end of the 12-month data gathering monitoring period in R 325.10610b(4) and receipt of the department's approval. Until the department approves the step 2 requirements, the ~~system~~ **supply** shall meet the step 1 TOC removals contained in subdivision (b) of this subrule.

(d) Applications made to the department by ~~suppliers of~~ **water supplies with** enhanced coagulation systems for approval of alternative minimum TOC removal (step 2) requirements under subdivision (c) of this subrule shall include, at a minimum, results of bench- or pilot-scale testing conducted under paragraph (i) of this subdivision to determine the alternate enhanced coagulation level:

(i) Alternate enhanced coagulation level is defined as coagulation at a coagulant dose and pH as determined by the method described in paragraphs (i) to (v) of this subdivision such that an incremental addition of 10 mg/l of alum, or equivalent amount of ferric salt, results in a TOC removal of less than or equal to 0.3 mg/l. The percent removal of TOC at this point is the minimum TOC removal required for the ~~system~~ **supply**. Once approved by the department, this minimum requirement supersedes the minimum TOC removal required

by table 1 of this rule. This requirement will be effective until the department approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve department-set alternative minimum TOC removal levels is a violation of these rules.

(ii) Bench- or pilot-scale testing of enhanced coagulation shall be conducted by using representative water samples and adding 10 mg/l increments of alum, or equivalent amounts of ferric salt, until the pH is reduced to a level less than or equal to the enhanced coagulation step 2 target pH shown in the following table:

Table 2 Enhanced coagulation step 2 target pH

Alkalinity (mg/l as calcium carbonate)	Target pH
0-60	5.5
>60-120	6.3
>120-240	7.0
>240	7.5

(iii) For waters with alkalinities of less than 60 mg/l for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the ~~supplier~~**supply** shall add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/l per 10 mg/l alum added, or equivalent addition of iron coagulant, is reached.

(iv) The ~~system~~**supply** may operate at any coagulant dose or pH necessary, and consistent with these rules, to achieve the minimum TOC percent removal approved under subdivision (c) of this subrule.

(v) If the TOC removal is consistently less than 0.3 mg/l of TOC per 10 mg/l of incremental alum dose at all dosages of alum, or equivalent addition of iron coagulant, the water is considered to contain TOC not amenable to enhanced coagulation. The ~~supplier~~**supply** may then apply to the department for a waiver of enhanced coagulation requirements. The department's determination will be made on a case-by-case basis and the department will consider supporting documentation from the water ~~supplier~~**supply** of bench or pilot scale testing designed to demonstrate the best level of TOC removal that is feasibly attainable, given the unique characteristics of the raw water to be treated.

(3) ~~Suppliers~~**Water supplies** shall calculate compliance using the methods in either of the following provisions, as applicable:

(a) ~~Suppliers of subpart H-systems~~**supplies**, other than those identified in subrule (1)(b) or (c) of this rule, shall comply with requirements contained in subrule (2)(b) or (c) of this rule. Suppliers shall calculate compliance quarterly, beginning after the ~~supplier~~**supply** has collected 12 months of data, by determining an annual average using the following method:

(i) Determine actual monthly TOC percent removal, equal to:  
 $(1 - (\text{treated water TOC} / \text{source water TOC})) \times 100$ .

(ii) Determine the required monthly TOC percent removal, from either table 1 of this rule or from subrule (2)(c) of this rule.

(iii) Divide the value in paragraph (i) of this subdivision by the value in paragraph (ii) of this subdivision.

(iv) Add together the results of paragraph (iii) of this subdivision for the last 12 months and divide by 12.

(v) If the value calculated in paragraph (iv) of this subdivision is less than 1.00, then the ~~system-supply~~ is not in compliance with the TOC percent removal requirements.

(b) Suppliers may use the provisions in paragraphs (i) through (v) of this subdivision instead of the calculations in subdivision (a)(i) through (v) of this subrule to determine compliance with TOC percent removal requirements, as follows:

(i) In any month that the ~~system's-supply's~~ treated or source water TOC level is less than 2.0 mg/l, the ~~supplier-supply~~ may assign a monthly value of 1.0, instead of the value calculated in subdivision (a)(iii) of this subrule, when calculating compliance under subdivision (a) of this subrule.

(ii) In any month that a ~~system-supply~~ practicing softening removes not less than 10 mg/l of magnesium hardness as calcium carbonate, the ~~supplier-supply~~ may assign a monthly value of 1.0, instead of the value calculated in subdivision (a)(iii) of this subrule, when calculating compliance under subdivision (a) of this subrule.

(iii) In any month that the ~~system's-supply's~~ source water SUVA, before any treatment, is less than or equal to 2.0 l/mg-m, the ~~supplier-supply~~ may assign a monthly value of 1.0, instead of the value calculated in subdivision (a)(iii) of this subrule, when calculating compliance under subdivision (a) of this subrule.

(iv) In any month that the ~~system's-supply's~~ finished water SUVA is less than or equal to 2.0 l/mg-m, the ~~supplier-supply~~ may assign a monthly value of 1.0, instead of the value calculated in subdivision (a)(iii) of this subrule, when calculating compliance under subdivision (a) of this subrule.

(v) In any month that a ~~system-supply~~ practicing enhanced softening lowers alkalinity below 60 mg/l as calcium carbonate, the ~~supplier-supply~~ may assign a monthly value of 1.0, instead of the value calculated in subdivision (a)(iii) of this subrule, when calculating compliance under subdivision (a) of this subrule.

(4) The treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems for subpart H ~~systems-supplies~~ using conventional filtration is enhanced coagulation or enhanced softening.

#### **R 325.10610d Disinfection Byproducts; General requirements.**

**Rule 610d. (1) This rule and R 325.10719h to R 325.10719n establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive supplies.**

**(2) Subject to these requirements are community and nontransient noncommunity water supplies that use a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light. These public water supplies are considered "water supplies" or "supplies" in this rule and R 325.10719h to R 325.10719n.**

**(3) The supply shall comply with all of the following provisions:**

**(a) The supply shall comply with the requirements in this rule and R 325.10719h to R325.10719n on the schedule in the following table based on the supply type:**

For supplies that are not part of a combined distribution system and supplies that serve the largest population in a combined distribution system of ...	The supply shall comply with monitoring required under R 325.10610d and R 325.10719h to R 325.10719n by...*
(i) 100,000 or more	April 1, 2012.

(ii) 50,000-99,999	October 1, 2012.
(iii) 10,000-49,999	October 1, 2013.
(iv) less than 10,000	October 1, 2013 if no <i>Cryptosporidium</i> monitoring is required under 40 CFR 141.701(a)(4) or October 1, 2014 if <i>Cryptosporidium</i> monitoring is required under 40 CFR 141.701(a)(4) or (a)(6). 40 CFR 141.701 is adopted by reference in R 325.10720b.
(v) For other supplies that are part of a combined distribution system, specifically consecutive supplies or wholesale supplies...	--at the same time as the supply with the earliest compliance date in the combined distribution system.

\* The department may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if the supply requires capital improvements to comply with an MCL.

(b) The monitoring frequency is specified in R 325.10719h(1)(a) and both of the following:

(i) If the supply is required to conduct quarterly monitoring, the supply shall begin monitoring in the first full calendar quarter that includes the compliance date in the table in this subrule.

(ii) If the supply is required to conduct monitoring at a frequency that is less than quarterly, the supply shall begin monitoring in the calendar month recommended in the IDSE report prepared under 40 CFR 141.601 or 40 CFR 141.602, adopted by reference in R 325.10719g, or the calendar month identified in the monitoring plan developed under R 325.10719i no later than 12 months after the compliance date in this table.

(c) If the supply is required to conduct quarterly monitoring, the supply shall make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If the supply is required to conduct monitoring at a frequency that is less than quarterly, the supply shall make compliance calculations beginning with the first compliance sample taken after the compliance date.

(d) For the purpose of the schedule in this subrule, the department may determine that the combined distribution system does not include certain consecutive supplies based on factors such as receiving water from a wholesale supply only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale supply. The department may also determine that the combined distribution system does not include certain wholesale supplies based on factors such as delivering water to a consecutive supply only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive supply.

(4) Compliance with the MCLs shall be based on both of the following:

(a) This subdivision applies to supplies required to monitor quarterly. To comply with MCLs in R 325.10610(2), the supply shall calculate LRAAs for TTHM and HAA5 using monitoring results collected under this rule and R 325.10719h to R 325.10719n and determine that each LRAA does not exceed the MCL. If the supply fails to complete four consecutive quarters of monitoring, the supply shall calculate compliance with the MCL based on the average of the available data from the most

recent four quarters. If the supply takes more than one sample per quarter at a monitoring location, the supply shall average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

(b) This subdivision applies to supplies required to monitor annually or less frequently. To determine compliance with MCLs in R 325.10610(2), the supply shall determine that each sample taken is less than the MCL. If a sample exceeds the MCL, the supply shall comply with the requirements of R 325.10719k. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

(5) The supply is in violation of the MCL when the LRAA exceeds the MCLs in R 325.10610(2), calculated based on four consecutive quarters of monitoring, or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters. The supply is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the supply fails to monitor.

(6) A consecutive supply that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, shall comply with monitoring requirements for chlorine and chloramines in R 325.10719e(3)(a) and the compliance requirements in R 325.10610b(1)(c) and (3)(a) and shall report monitoring results under R 325.10719f(3)(a).

R 325.10611a Filtration and disinfection; disinfection.

Rule 611a. (1) Subpart H ~~systems~~**supplies** shall provide sufficient disinfectant contact time before the water enters the distribution system to assure adequate disinfection.

(2) Subpart H ~~systems~~**supplies** shall provide disinfection treatment achieving all of the following conditions:

(a) The disinfection treatment shall be sufficient to ensure that the total treatment processes of that system achieve the standards set forth in R 325.10611(3)(a).

(b) The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 milligrams per liter for more than 4 hours.

(c) The residual disinfectant concentration in the distribution system, measured as total chlorine, free available chlorine, combined chlorine, or chlorine dioxide shall not be undetectable in more than 5% of the samples each month for any 2 consecutive months that the ~~system~~**supply** serves water to the public. Water in the distribution system that has a heterotrophic bacteria concentration less than or equal to 500 per milliliter, measured as heterotrophic plate count (HPC), is considered to have a detectable disinfectant residual for purposes of determining compliance with this subdivision.

(d) If the department determines, based on site specific considerations, that a ~~system~~**supply** does not have means for having a sample transported and analyzed for HPC and that the ~~system~~**supply** is providing adequate disinfection in the distribution system, then the requirements of subdivision (c) of this subrule do not apply.

R 325.10611b Filtration and disinfection; filtration.

Rule 611b. (1) ~~Suppliers of subpart H systems~~**supplies** shall comply with all of the following filtration requirements, as applicable:

<i>For a <del>system</del><b>supply</b> using...</i>	<i>(i) The turbidity level of representative samples of a <del>system's</del><b>supply's</b> filtered water shall at no time exceed...</i>	<i>(ii) Not less than 95% of the measurements taken each month shall be less than or equal to...</i>
(a) Conventional, direct, or membrane filtration	1 ntu / 5 ntu <sup>+</sup>	0.3 ntu / 0.5 ntu <sup>2</sup>

(b) Slow sand or diatomaceous earth filtration	5 ntu	1 ntu
(c) An alternative filtration technology approved by the department, based on the demonstration described in subrule (3) of this rule.	The department-set turbidity level, not to exceed 5 ntu, based on the demonstration described in subrule (3) of this rule.	The department-set turbidity level, not to exceed 1 ntu, based on the demonstration described in subrule (3) of this rule.

<sup>1</sup> The 1 ntu level applies to systems serving 10,000 or more people and the 5 ntu level applies to systems serving fewer than 10,000 people until December 31, 2004. Beginning January 1, 2005, the 5 ntu level and this footnote no longer apply and all systems subject to this rule shall comply with the 1 ntu level.

<sup>2</sup> The 0.3 ntu level applies to systems serving 10,000 or more people and the 0.5 ntu level applies to systems serving fewer than 10,000 people until December 31, 2004. Beginning January 1, 2005, the 0.5 ntu level and this footnote no longer apply and all systems subject to this rule shall comply with the 0.3 ntu level.

(2) A ~~system~~ **supply** using lime softening, where the final pH exceeds 8.3, may acidify representative samples before turbidity analysis using a protocol approved by the department. The approved protocol shall require the use of a concentrated acid in sufficient quantities to lower the pH to less than 8.3, dissolve only calcium carbonate and magnesium hydroxide, and not to dilute the representative sample.

(3) A public water ~~system~~ **supply** may use a filtration technology not listed in subrule (1)(a) or (b) of this rule if the ~~supplier~~ **supply** demonstrates to the department, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of R 325.10611a(2), consistently achieves the removal or inactivation percentages in R 325.10611(3), and the department approves the use of the filtration technology. For each approval, the department will set turbidity performance requirements that the ~~system~~ **supply** shall meet not less than 95% of the time and the ~~system~~ **supply** shall not exceed, at any time, at a level in subrule (1)(c) of this rule that consistently achieves the removal or inactivation percentages in R 325.10611(3).

#### **R 325.10611d Enhanced treatment for Cryptosporidium; general requirements.**

**Rule 611d. (1) The requirements in this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e establish or extend treatment technique requirements instead of maximum contaminant levels for Cryptosporidium. These requirements are in addition to requirements for filtration and disinfection in R 325.10611 to R 325.10611c, R 325.10720 to R 325.10720a, and R 325.10722.**

**(2) The requirements of this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e apply to all subpart H supplies, which are community and noncommunity water supplies supplied by a surface water source and community and noncommunity water supplies supplied by a groundwater source under the direct influence of surface water (GWUDI). These public water supplies are considered "water supplies" or "supplies" in this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e. Both of the following apply to this rule:**

**(a) Wholesale supplies, as defined in R 325.10109, shall comply with the requirements of this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e based on the population of the largest supply in the combined distribution system.**

**(b) The requirements of this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e apply to subpart H supplies required by these rules to provide filtration treatment, whether or not the supply is currently operating a filtration system.**

**(3) Supplies subject to this rule, R 325.10611e to R 325.10611n, and R 325.10720b to R 325.10720e shall comply with the following requirements:**



(a) Supplies shall conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium*, *E. coli*, and turbidity as described in 40 CFR 141.701 to 40 CFR 141.706, as adopted by reference in R 325.10720b, to determine what level, if any, of additional *Cryptosporidium* treatment they shall provide.

(b) Supplies that plan to make a significant change to their disinfection practice shall develop disinfection profiles and calculate disinfection benchmarks, as described in R 325.10720c to R 325.10720d.

(c) Supplies shall determine their *Cryptosporidium* treatment bin classification as described in R 325.10611e and provide additional treatment for *Cryptosporidium*, if required, as described in R 325.10611f. Supplies shall implement *Cryptosporidium* treatment according to the schedule in R 325.10611g.

(d) Supplies required to provide additional treatment for *Cryptosporidium* shall implement microbial toolbox options that are designed and operated as described in R 325.10611h to R 325.10611m.

(e) Supplies shall comply with the applicable recordkeeping and reporting requirements described in R 325.10720e to R 325.10720e.

(f) Supplies shall address significant deficiencies identified in sanitary surveys performed by EPA as described in R 325.10611n.

**R 325.10611e Enhanced treatment for *Cryptosporidium*; treatment technique; bin classification.**

**Rule 611e. (1)** Following completion of the initial round of source water monitoring required under 40 CFR 141.701(a), as adopted by reference in R 325.10720b, subpart H supplies that are subject to R 325.10611d shall calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. These public water supplies are also considered "water supplies" or "supplies" in this rule. Calculation of the bin concentration shall use the *Cryptosporidium* results reported under 40 CFR 141.701(a) and shall follow the procedures in subrule (2) of this rule.

**(2)** Use the following criteria to determine bin classification:

(a) For supplies that collect a total of not less than 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

(b) For supplies that collect a total of not less than 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(c) For supplies that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only 1 year, that is, collect 24 samples in 12 months, the bin concentration is equal to the arithmetic mean of all sample concentrations.

(d) For supplies with plants operating only part of the year that monitor fewer than 12 months per year under 40 CFR 141.701(e), as adopted by reference in R 325.10720b, the bin concentration is equal to the highest arithmetic mean of all sample concentrations during a year of *Cryptosporidium* monitoring.

(e) If the monthly *Cryptosporidium* sampling frequency varies, supplies shall first calculate a monthly average for each month of monitoring. Supplies shall then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in subdivisions (a) to (d) of this subrule.

**(3)** Supplies shall determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under subrules (1) and (2) of this rule:

**Bin Classification Table for Filtered Supplies**

<b>For supplies that are:</b>	<b>With a Cryptosporidium bin concentration of ... *</b>	<b>The bin classification is ...</b>
<b>... required to monitor for Cryptosporidium under 40 CFR 141.701 as adopted by reference in R 325.10720b.</b>	<b>Cryptosporidium less than 0.075 oocyst/L</b>	<b>Bin 1.</b>
	<b>Cryptosporidium greater than or equal to 0.075 and less than 1.0 oocysts/L</b>	<b>Bin 2</b>
	<b>Cryptosporidium greater than or equal to 1.0 and less than 3.0 oocysts/L</b>	<b>Bin 3</b>
	<b>Cryptosporidium greater than or equal to 3.0 oocysts/L.</b>	<b>Bin 4</b>
<b>... serving fewer than 10,000 people and NOT required to monitor for Cryptosporidium under 40 CFR 141.701(a)(4).</b>	<b>Not applicable</b>	<b>Bin 1</b>

\* Based on calculations in subrule (1) or (4) of this rule, as applicable.

(4) Following completion of the second round of source water monitoring required under 40 CFR 141.701(b), supplies shall recalculate their Cryptosporidium bin concentration using the Cryptosporidium results reported under 40 CFR 141.701(b) and following the procedures in subrule (2)(a) to (2)(d) of this rule. Supplies shall then redetermine their bin classification using this bin concentration and the table in subrule (3) of this rule.

(5) The following apply to reporting the bin classification to the department:

(a) Supplies shall report their initial bin classification under subrule (3) of this rule to the department for approval no later than 6 months after the supply is required to complete initial source water monitoring based on the schedule in 40 CFR 141.701(c).

(b) Supplies shall report their bin classification under subrule (4) of this rule to the department for approval no later than 6 months after the supply is required to complete the second round of source water monitoring based on the schedule in 40 CFR 141.701(c).

(c) The bin classification report to the department shall include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

(6) Failure to comply with the conditions of subrule (5) is a violation of the treatment technique requirement.

**R 325.10611f Enhanced treatment for Cryptosporidium; treatment technique; additional Cryptosporidium treatment requirements.**

**Rule 611f.** (1) Subpart H supplies are also considered "water supplies" or "supplies" in this rule. Subpart H supplies that are subject to R 325.10611d shall provide the level of additional treatment for Cryptosporidium specified in the

following table based on their bin classification as determined under R 325.10611e and according to the schedule in R 325.10611g:

If the supply bin classification is ...	And the supply uses the following filtration treatment in full compliance with R 325.10611 to R 325.10611c, R 325.10720 to R 325.10720a, and R 325.10722, as applicable, then the additional Cryptosporidium treatment requirements are ...			
	Conventional filtration or membrane filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies approved by the department under R 325.10611b(3)
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	Note 1
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	Note 2
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	Note 3

**Note 1:** As determined by the department such that the total Cryptosporidium removal and inactivation is not less than 4.0-log.

**Note 2:** As determined by the department such that the total Cryptosporidium removal and inactivation is not less than 5.0-log.

**Note 3:** As determined by the department such that the total Cryptosporidium removal and inactivation is not less than 5.5-log.

(2) All of the following provisions apply to microbial toolbox options:

(a) Supplies shall use 1 or more of the treatment and management options listed in R 325.10611h, termed the microbial toolbox, to comply with the additional Cryptosporidium treatment required in subrule (1) of this rule.

(b) Supplies classified in Bin 3 and Bin 4 shall achieve not less than 1-log of the additional Cryptosporidium treatment required under subrule (1) of this rule using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in R 325.10611i to R 325.10611m.

(3) Failure by a supply in a month to achieve treatment credit by meeting criteria in R 325.10611i to R 325.10611m for microbial toolbox options that is not less than equal to the level of treatment required in subrule (1) of this rule is a violation of the treatment technique requirement.

(4) If the department determines during a sanitary survey or an equivalent source water assessment that after a supply completed the monitoring conducted under 40 CFR 141.701(a) or 40 CFR 141.701(b), as adopted by reference in R 325.10720b, significant changes occurred in the supply's watershed that could lead to increased contamination of the source water by Cryptosporidium, the supply shall take actions

specified by the department to address the contamination. These actions may include additional source water monitoring or implementing microbial toolbox options listed in R 325.10611h, or both.

**R 325.10611g Enhanced treatment for Cryptosporidium; treatment technique; schedule for compliance with Cryptosporidium treatment requirements.**

Rule 611g. (1) Following initial bin classification under R 325.10611e(3), Subpart H supplies that are subject to R 325.10611d shall provide the level of treatment for Cryptosporidium required under R 325.10611f according to the schedule in subrule (2) of this rule.

(2) Cryptosporidium treatment compliance dates are listed in the following table:

**Cryptosporidium Treatment Compliance Dates Table**

Subpart H supplies that serve ...	Shall comply with Cryptosporidium treatment requirements no later than ... *
(a) Not fewer than 100,000 people.	(i) April 1, 2012.
(b) From 50,000 to 99,999 people.	(i) October 1, 2012.
(c) From 10,000 to 49,999 people.	(i) October 1, 2013.
(d) Fewer than 10,000 people.	(i) October 1, 2014.

\* The department may allow up to an additional 2 years for complying with the treatment requirement for supplies making capital improvements.

(3) If the bin classification for a supply changes following the second round of source water monitoring, as determined under R 325.10611e(4), the supply shall provide the level of treatment for Cryptosporidium required under R 325.10611f on a schedule the department approves.

**R 325.10611h Enhanced treatment for Cryptosporidium; microbial toolbox options for meeting Cryptosporidium treatment requirements.**

Rule 611h. (1) Subpart H supplies that are subject to R 325.10611d receive the treatment credits listed in the table in subrule (2) of this rule by meeting the conditions for microbial toolbox options described in R 325.10611i to R 325.10611m. Subpart H supplies apply these treatment credits to meet the treatment requirements in R 325.10611f.

(2) The following table summarizes options in the microbial toolbox:

**Microbial Toolbox Summary Table: Options, Treatment Credits and Criteria**

Toolbox Option	Cryptosporidium treatment credit with design and implementation criteria
<b>Source Protection and Management Toolbox Options</b>	
(a) Watershed control program	0.5-log credit for department-approved program comprising required elements, annual program status report to department, and regular watershed survey. Specific criteria are in R 325.10611i(1).
(b) Alternative source/intake management	No prescribed credit. Subpart H supplies may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in R 325.10611i(2).
<b>Pre Filtration Toolbox Options</b>	

<b>(c) Presedimentation basin with coagulation</b>	<b>0.5-log credit during a month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative department-approved performance criteria. To be eligible, basins shall be operated continuously with coagulant addition and all plant flow shall pass through basins. Specific criteria are in R 325.10611j(1).</b>
<b>(d) Two-stage lime softening</b>	<b>0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow shall pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in R 325.10611j(2).</b>
<b>(e) Bank filtration</b>	<b>0.5-log credit for 25-foot setback; 1.0- log credit for 50-foot setback; aquifer shall be unconsolidated sand containing not less than 10 percent fines; average turbidity in wells shall be less than 1 NTU. Subpart H supplies using wells followed by filtration when conducting source water monitoring shall sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in R 325.10611j(3).</b>
<b>Treatment Performance Toolbox Options</b>	
<b>(f) Combined filter performance</b>	<b>0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in not less than 95 percent of measurements each month. Specific criteria are in R 325.10611k(1).</b>
<b>(g) Individual filter performance</b>	<b>0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in not less than 95 percent of samples each month in each filter and is never greater than 0.3 NTU in 2 consecutive measurements in a filter. Specific criteria are in R 325.10611k(2).</b>
<b>(h) Demonstration of performance</b>	<b>Credit awarded to unit process or treatment train based on a demonstration to the department with a department-approved protocol. Specific criteria are in R 325.10611k(3).</b>
<b>Additional Filtration Toolbox Options</b>	
<b>(i) Bag or cartridge filters (individual filters).</b>	<b>Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in R 325.10611l(1).</b>
<b>(j) Bag or cartridge filters (in series).</b>	<b>Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in R 325.10611l(1).</b>
<b>(k) Membrane filtration</b>	<b>Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in R 325.10611l(2).</b>
<b>(l) Second stage filtration</b>	<b>0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation before first filter. Specific criteria are in R 325.10611l(3)</b>

(m) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in R 325.10611l(4).
<b>Inactivation Toolbox Options</b>	
(n) Chlorine dioxide	Log credit based on measured CT in relation to CT table. Specific criteria in R 325.10611m(2).
(o) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria in R 325.10611m(2).
(p) UV	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in R 325.10611m(4).

**R 325.10611i Enhanced treatment for Cryptosporidium; microbial toolbox; source toolbox components.**

**Rule 611i. (1) Watershed control program is a source toolbox component. Subpart H supplies that are subject to R 325.10611d receive 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets all of the following requirements:**

**(a) Subpart H supplies that intend to apply for the watershed control program credit shall notify the department of this intent no later than 2 years before the treatment compliance date applicable to the supply in R 325.10611g.**

**(b) Subpart H supplies shall submit to the department a proposed watershed control plan no later than 1 year before the applicable treatment compliance date in R 325.10611g. The supply shall receive department approval of the watershed control plan for the supply to receive watershed control program treatment credit. The watershed control plan shall include all of the following elements:**

**(i) Identification of an "area of influence" outside of which the likelihood of Cryptosporidium or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (ii) of this subdivision.**

**(ii) Identification of both potential and actual sources of Cryptosporidium contamination and an assessment of the relative impact of these sources on the supply's source water quality.**

**(iii) An analysis of the effectiveness and feasibility of control measures that could reduce Cryptosporidium loading from sources of contamination to the supply's source water.**

**(iv) A statement of goals and specific actions the supply will undertake to reduce source water Cryptosporidium levels. The plan shall explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.**

**(c) Subpart H supplies with existing watershed control programs, that is, programs in place on the effective date of this rule, are eligible to seek this credit. Their watershed control plans shall meet the criteria in subdivision (b) of this subrule and shall specify ongoing and future actions that will reduce source water Cryptosporidium levels.**

**(d) If the department does not respond to a Subpart H supply regarding approval of a watershed control plan submitted under this rule and the supply meets the other requirements of this rule, the watershed control program will be considered approved**

and 0.5 log *Cryptosporidium* treatment credit will be awarded unless the department subsequently withdraws that approval.

(e) Subpart H supplies shall complete all of the following actions to maintain the 0.5-log credit:

(i) Submit an annual watershed control program status report to the department. The annual watershed control program status report shall describe the supply's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It shall explain how the supply is addressing the shortcomings in plan implementation, including those previously identified by the department or as the result of the watershed survey conducted under paragraph (ii) of this subdivision. It shall also describe the significant changes that have occurred in the watershed since the last watershed sanitary survey. If a supply determines during implementation that making a significant change to its approved watershed control program is necessary, the supply shall notify the department before making the changes. If a change is likely to reduce the level of source water protection, the supply shall also list in its notification the actions the supply will take to mitigate this effect.

(ii) Undergo a watershed sanitary survey every 3 years for community water supplies and every 5 years for noncommunity water supplies and submit the survey report to the department. The survey shall be conducted according to department guidelines and by persons the department approves. Both of the following apply to watershed sanitary surveys:

(A) The watershed sanitary survey shall meet all of the following criteria: encompass the region identified in the department-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify the significant new sources of *Cryptosporidium*.

(B) If the department determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, supplies shall undergo another watershed sanitary survey by a date the department requires, which may be earlier than the regular date in this subdivision.

(iii) The supply shall make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents shall be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The department may approve supplies to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

(f) If the department determines that a Subpart H supply is not carrying out the approved watershed control plan, the department may withdraw the watershed control program treatment credit.

(2) Alternative source is a source toolbox component. All of the following provisions apply to an alternative source:

(a) A Subpart H supply may conduct source water monitoring that reflects a different intake location, either in the same source or for an alternate source, or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the department approves, a supply may determine its bin classification under R 325.10611e based on the alternative source monitoring results.

(b) If Subpart H supplies conduct alternative source monitoring under subdivision (a) of this subrule, supplies shall also monitor their current plant intake concurrently as described in 40 CFR 141.701, as adopted by reference in R 325.10720b.

(c) Alternative source monitoring under subdivision (a) of this subrule shall meet the requirements for source monitoring to determine bin classification, as described

in 40 CFR 141.701 to 40 CFR 141.706, as adopted by reference in R 325.10720b. Subpart H supplies shall report the alternative source monitoring results to the department, along with supporting information documenting the operating conditions under which the samples were collected.

(d) If a Subpart H supply determines its bin classification under R 325.10611e using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the supply shall relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in R 325.10611g.

**R 325.10611j Enhanced treatment for Cryptosporidium; microbial toolbox; pre-filtration treatment toolbox components.**

**Rule 611j. (1) Presedimentation is a pre-filtration treatment toolbox component. Subpart H supplies that are subject to R 325.10611d receive 0.5-log Cryptosporidium treatment credit for a presedimentation basin during any month the process meets all of the following criteria:**

**(a) The presedimentation basin shall be in continuous operation and shall treat the entire plant flow taken from a surface water or GWUDI source.**

**(b) The subpart H supply shall continuously add a coagulant to the presedimentation basin.**

**(c) The presedimentation basin shall achieve either of the following performance criteria:**

**(i) Demonstrates not less than 0.5-log mean reduction of influent turbidity. This reduction shall be determined using daily turbidity measurements in the presedimentation process influent and effluent and shall be calculated as follows:**

**$\log_{10}(\text{monthly mean of daily influent turbidity}) - \log_{10}(\text{monthly mean of daily effluent turbidity}).$**

**(ii) Complies with department-approved performance criteria that demonstrate not less than 0.5-log mean removal of micron-sized particulate material through the presedimentation process.**

**(2) Two-stage lime softening is a pre-filtration treatment toolbox component. Supplies receive an additional 0.5-log Cryptosporidium treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in 2 separate and sequential softening stages before filtration. Both softening stages shall treat the entire plant flow taken from a surface water or GWUDI source.**

**(3) Bank filtration is a pre-filtration treatment toolbox component. Supplies using bank filtration when they begin source water monitoring under 40 CFR 141.701(a) shall collect samples as described in 40 CFR 141.703(d) and are not eligible for this credit. The department adopts 40 CFR 141.701 and 40 CFR 141.703 by reference in R 325.10720b. Supplies receive Cryptosporidium treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting all of the following criteria:**

**(a) Wells with a groundwater flow path of not less than 25 feet receive 0.5-log treatment credit; wells with a groundwater flow path of not less than 50 feet receive 1.0-log treatment credit. The groundwater flow path shall be determined as specified in subdivision (d) of this subrule.**

**(b) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A subpart H supply shall characterize the aquifer at the well site to determine aquifer properties. Supplies shall extract a core from the aquifer**



and demonstrate that in not less than 90 percent of the core length, grains less than 1.0 mm in diameter constitute not less than 10 percent of the core material.

(c) Only horizontal and vertical wells are eligible for treatment credit.

(d) For vertical wells, the groundwater flow path is the measured distance from the edge of the surface water body under high flow conditions, determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps, to the well screen. For horizontal wells, the groundwater flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

(e) Subpart H supplies shall monitor each wellhead for turbidity at least once every 4 hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the supply shall report this result to the department and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the department determines that microbial removal has been compromised, the department may revoke treatment credit until the supply implements corrective actions approved by the department to remediate the problem.

(f) Springs and infiltration galleries are not eligible for treatment credit under this rule, but are eligible for credit under R 325.10611k(3).

(g) The department may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in subdivisions (a) to (e) of this subrule. The bank filtration demonstration of performance study shall meet both of the following criteria:

(i) The study shall follow a department-approved protocol and shall involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.

(ii) The study shall include sampling both from the production well or wells and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well or wells.

**R 325.10611k Enhanced treatment for *Cryptosporidium*; microbial toolbox; treatment performance toolbox components.**

**Rule 611k. (1) Combined filter performance is a treatment performance toolbox component. Subpart H supplies that are subject to R 325.10611d and that use conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the supply meets the criteria in this subrule. Combined filter effluent (CFE) turbidity shall be less than or equal to 0.15 NTU in not less than 95 percent of the measurements. Turbidity shall be measured as described in R 325.10605 and R 325.10720(2).**

**(2) Individual filter performance is a treatment performance toolbox component. Compliance with the criteria in this subrule shall be based on individual filter turbidity monitoring as described in R 325.10720(2)(c) to (d). Subpart H supplies using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under subrule (1) of this rule, during any month the supply meets all of the following criteria:**

**(a) The filtered water turbidity for each individual filter shall be less than or equal to 0.15 NTU in not less than 95 percent of the measurements recorded each month.**

(b) No individual filter may have a measured turbidity greater than 0.3 NTU in 2 consecutive measurements taken 15 minutes apart.

(c) A supply that has received treatment credit for individual filter performance and fails to meet the requirements of subdivision (a) or (b) of this subrule during any month does not receive a treatment technique violation under R 325.10611f(3) if the department determines both of the following:

(i) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

(ii) The supply has experienced no more than 2 such failures in any calendar year.

(3) Demonstration of performance is a treatment performance toolbox component. The department may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study. This treatment credit may be greater than or less than the prescribed treatment credits in R 325.10611f or R 325.10611j to R 325.10611m and may be awarded to treatment processes that do not meet the criteria for the prescribed credits. All of the following apply to the demonstration of performance study:

(a) Subpart H supplies cannot receive the prescribed treatment credit for any toolbox option in R 325.10611j to R 325.10611m if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this subrule.

(b) The demonstration of performance study shall follow a department-approved protocol, using pilot plant studies or other means, and shall demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the supply.

(c) Approval by the department shall be in writing and may include monitoring and treatment performance criteria that the supply shall demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The department may designate those criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

**R 325.10611l ("el" not "one")** Enhanced treatment for *Cryptosporidium*; microbial toolbox; additional filtration toolbox components.

**Rule 611l.** (1) Bag and cartridge filters is an additional filtration toolbox component. Subpart H supplies that are subject to R 325.10611d receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series. To be eligible for this credit, supplies shall report the results of challenge testing that meets the requirements of subdivision (b) to (i) of this subrule to the department. The filters shall treat the entire plant flow taken from a surface water or GWUDI source. All of the following apply to bag and cartridge filters as an additional filtration toolbox component:

(a) The *Cryptosporidium* treatment credit awarded to bag or cartridge filters shall be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in subdivision (b) to (i) of this subrule. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series shall be applied to challenge testing results to determine removal credit. Subpart H supplies may use results from challenge testing conducted before January 5, 2006 if the prior testing was consistent with the criteria specified in subdivision (b) to (i) of this subrule.

(b) Challenge testing shall be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the supply will use for removal of *Cryptosporidium*. Bag or cartridge filters shall be challenge tested in the same configuration that the supply will use, either as individual filters or as a series configuration of filters.

(c) Challenge testing shall be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium*. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate shall be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

(d) The maximum feed water concentration that can be used during a challenge test shall be based on the detection limit of the challenge particulate in the filtrate, that is filtrate detection limit, and shall be calculated using the following equation:

$$\text{Maximum Feed Concentration} = 1 \times 10^4 \times (\text{Filtrate Detection Limit})$$

(e) Challenge testing shall be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

(f) Each filter evaluated shall be tested for a duration sufficient to reach 100% of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of R 325.10611d to R 325.10611n and R 325.10720b to R 325.10720e.

(g) Removal efficiency of a filter shall be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$\text{LRV} = \text{LOG}_{10}(\text{Cf}) - \text{LOG}_{10}(\text{Cp})$$

Where:

LRV = log removal value demonstrated during challenge testing; Cf = the feed concentration measured during the challenge test; and Cp = the filtrate concentration measured during the challenge test. In applying this equation, the same units shall be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term Cp shall be set equal to the detection limit.

(h) Each filter tested shall be challenged with the challenge particulate during all of the following periods over the filtration cycle:

(i) Within 2 hours of start-up of a new filter.

(ii) When the pressure drop is between 45 and 55 percent of the terminal pressure drop.

(iii) At the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop.

Note to subdivision (h) of this subule: An LRV shall be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV<sub>filter</sub>) shall be assigned the value of the minimum LRV observed during the 3 challenge periods for that filter.

(i) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line shall be set equal to the lowest LRV<sub>filter</sub> among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line shall be set equal to the 10th percentile of the set of LRV<sub>filter</sub> values for the various filters

tested. The percentile is defined by  $(i/(n+1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(j) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter shall be conducted and submitted to the department.

(2) All of the following apply to membrane filtration as an additional filtration toolbox component:

(a) Subpart H supplies receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this subrule. Membrane cartridge filters that meet the definition of membrane filtration in R 325.10106 are eligible for this credit. The level of treatment credit a supply receives is equal to the lower of the values determined under both of the following:

(i) The removal efficiency demonstrated during challenge testing conducted under the conditions in subdivision (b) of this subrule.

(ii) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in subdivision (c) of this subrule.

(b) Challenge testing demonstrates removal efficiency. The membrane used by the subpart H supply shall undergo challenge testing to evaluate removal efficiency, and the supply shall report the results of challenge testing to the department. Challenge testing shall be conducted according to all of the criteria in paragraph (i) to (vii) of this subdivision. Subpart H supplies may use data from challenge testing conducted before January 5, 2006 if the prior testing was consistent with all of the criteria in paragraph (i) to (vii) of this subdivision.

(i) Challenge testing shall be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the supply's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(ii) Challenge testing shall be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, shall be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and shall be determined according to the following equation:

$$\text{Maximum Feed Concentration} = 3.16 \times 10^6 \times (\text{Filtrate Detection Limit})$$

(iv) Challenge testing shall be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to

filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process, that is, backwashing.

(v) Removal efficiency of a membrane module shall be calculated from the challenge test results and expressed as a log removal value according to the following equation:

$$\text{LRV} = \text{LOG}_{10}(\text{Cf}) - \text{LOG}_{10}(\text{Cp})$$

Where:

LRV = log removal value demonstrated during the challenge test; Cf = the feed concentration measured during the challenge test; and Cp = the filtrate concentration measured during the challenge test. Equivalent units shall be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term Cp is set equal to the detection limit for the purpose of calculating the LRV. An LRV shall be calculated for each membrane module evaluated during the challenge test.

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing shall be expressed as a log removal value (LRVC-Test). If fewer than 20 modules are tested, then LRVC-Test is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then LRVC-Test is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by  $(i/(n+1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(vii) The challenge test shall establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test shall be applied to each production membrane module used by the supply that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

(viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane shall be conducted and submitted to the department.

(c) Direct integrity testing demonstrates removal efficiency. Subpart H supplies shall conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., 1 or more leaks that could result in contamination of the filtrate). The direct integrity testing shall meet all of the following requirements:

(i) The direct integrity test shall be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(ii) The direct integrity method shall have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(iii) The direct integrity test shall have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the department, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity shall be determined using the approach in either of the following as applicable to the type of direct integrity test the supply uses:

(A) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity shall be calculated according to the following equation:

$$\text{LRVDIT} = \text{LOG}_{10} (\text{Qp} / (\text{VCF} \times \text{Qbreach}))$$

Where:

LRVDIT = the sensitivity of the direct integrity test; Qp = total design filtrate flow from the membrane unit; Qbreach = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(B) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity shall be calculated according to the following equation:

$$\text{LRVDIT} = \text{LOG}_{10}(\text{Cf}) - \text{LOG}_{10}(\text{Cp})$$

Where:

LRVDIT = the sensitivity of the direct integrity test; Cf = the typical feed concentration of the marker used in the test; and Cp = the filtrate concentration of the marker from an integral membrane unit.

(iv) Supplies shall establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the department.

(v) If the result of a direct integrity test exceeds the control limit established under paragraph (iv) of this subdivision, the supply shall remove the membrane unit from service. Supplies shall conduct a direct integrity test to verify the repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

(vi) Supplies shall conduct direct integrity testing on each membrane unit at a frequency of at least once each day that the membrane unit is in operation. The department may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.

(d) Indirect integrity monitoring is required on membrane units. Supplies shall conduct continuous indirect integrity monitoring on each membrane unit according to all of the criteria in this subdivision. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A supply that implements continuous direct integrity testing of membrane units under the criteria in subdivision (c)(i) to (v) of this subrule is not subject to the requirements for continuous indirect integrity monitoring. Supplies shall submit a monthly report to the department summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action

that was taken in each case. All of the following apply to continuous indirect integrity monitoring on each membrane unit:

- (i) Unless the department approves an alternative parameter, continuous indirect integrity monitoring shall include continuous filtrate turbidity monitoring.
- (ii) Continuous monitoring shall be conducted at a frequency of at least once every 15 minutes.
- (iii) Continuous monitoring shall be separately conducted on each membrane unit.
- (iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes, that is, 2 consecutive 15-minute readings above 0.15 NTU, direct integrity testing shall immediately be performed on the associated membrane unit as specified in subdivision (c)(i) to (v) of this subrule.
- (v) If indirect integrity monitoring includes a department-approved alternative parameter and if the alternative parameter exceeds a department-approved control limit for a period greater than 15 minutes, direct integrity testing shall immediately be performed on the associated membrane units as specified in subdivision (c)(i) to (v) of this subrule.

(3) Second stage filtration is an additional filtration toolbox component. Subpart H supplies receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the department approves. To be eligible for this credit, the first stage of filtration shall be preceded by a coagulation step and both filtration stages shall treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The department shall approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(4) Slow sand filtration, as secondary filter, is an additional filtration toolbox component. Subpart H supplies are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The department shall approve the treatment credit based on an assessment of the design characteristics of the filtration process. This subrule does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

**R 325.10611m Enhanced treatment for *Cryptosporidium*; microbial toolbox; inactivation toolbox components.**

**Rule 611m. (1) Calculation of CT values is an inactivation toolbox component. All of the following apply to CT calculation of subpart H supplies that are subject to R 325.10611d:**

(a) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Subpart H supplies with treatment credit for chlorine dioxide or ozone under subrule (2) or (3) of this rule shall calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in R 325.10605.

(b) Subpart H supplies with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, supplies shall add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

(2) CT values for chlorine dioxide and ozone is an inactivation toolbox component. Both of the following apply to CT values:

(a) Subpart H supplies receive the *Cryptosporidium* treatment credit listed in the following table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subrule (1) of this rule:

**CT Values in milligram-minutes per liter (mg-min/L) for *Cryptosporidium* Inactivation by Chlorine Dioxide \***

Log credit	Water Temperature, in degrees Celsius										
	less than or equal to 0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0	637	610	558	511	429	360	277	179	116	75	49
(iv) 1.5	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5	1594	1525	1396	1278	1072	899	691	447	289	188	122
(vii) 3.0	1912	1830	1675	1534	1286	1079	830	536	347	226	147

\* Supplies may use this equation to determine log credit between the indicated values:  $\text{Log credit} = (0.001506 \times (1.09116)\text{Temp}) \times \text{CT}$ .

(b) Subpart H supplies receive the *Cryptosporidium* treatment credit listed in the following table by meeting the corresponding ozone CT values for the applicable water temperature, as described in subrule (1) of this rule:

**CT Values in milligram-minutes per liter (mg-min/L) for *Cryptosporidium* Inactivation by Ozone \***

Log credit	Water Temperature, in degrees Celsius										
	less than or equal to 0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0	72	69	63	57	47	39	30	19	12	7.4	4.7

\* Supplies may use this equation to determine log credit between the indicated values:  $\text{Log credit} = (0.0397 \times (1.09757)\text{Temp}) \times \text{CT}$ .

(3) Site-specific study is an inactivation toolbox component. The department may approve alternative chlorine dioxide or ozone CT values to those listed in subrule (2) of this rule on a site-specific basis. The department shall base this approval on a site-specific study a subpart H supply conducts that follows a department-approved protocol.



(4) Ultraviolet light is an inactivation toolbox component. Subpart H supplies receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in subdivision (a) of this subrule. Supplies shall validate and monitor UV reactors as described in subdivision (b) to (c) of this subrule to demonstrate that they are achieving a particular UV dose value for treatment credit. All of the following apply to UV:

(a) The following table is the UV dose table. The treatment credits listed in this table are for UV light at a wavelength of 254 nanometers as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, subpart H supplies shall demonstrate an equivalent germicidal dose through reactor validation testing, as described in subdivision (b) of this subrule. The UV dose values in this table are applicable only to post-filter applications of UV in supplies.

**UV Dose Table for *Cryptosporidium*, *Giardia lamblia*, and Virus Inactivation Credit**

Log credit	<i>Cryptosporidium</i> UV dose in millijoule per centimeters squared (mJ/ cm <sup>2</sup> )	<i>Giardia lamblia</i> UV dose (mJ/cm <sup>2</sup> )	Virus UV dose (mJ/cm <sup>2</sup> )
(i) 0.5	1.6	1.5	39
(ii) 1.0	2.5	2.1	58
(iii) 1.5	3.9	3.0	79
(iv) 2.0	5.8	5.2	100
(v) 2.5	8.5	7.7	121
(vi) 3.0	12	11	143
(vii) 3.5	15	15	163
(viii) 4.0	22	22	186

(b) Subpart H supplies shall use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in subdivision (a) of this subrule, that is, validated operating conditions. These operating conditions shall include flow rate, UV intensity as measured by a UV sensor, and UV lamp status. All of the following provisions apply to reactor validation testing:

(i) When determining validated operating conditions, supplies shall account for all of the following factors:

- (A) UV absorbance of the water; lamp fouling and aging.
- (B) Measurement uncertainty of on-line sensors.
- (C) UV dose distributions arising from the velocity profiles through the reactor
- (D) Failure of UV lamps or other critical system components.
- (E) Inlet and outlet piping or channel configurations of the UV reactor.

(ii) Validation testing shall include both of the following:

(A) Full scale testing of a reactor that conforms uniformly to the UV reactors used by the supply.

(B) Inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(iii) The department may approve an alternative approach to validation testing.

(c) Both of the following provisions apply to reactor monitoring.

(i) Supplies shall monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under subdivision (b) of this subrule. This monitoring shall include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the department designates based on UV reactor operation. Supplies shall verify the calibration of UV sensors and shall recalibrate sensors under a protocol the department approves.

(ii) To receive treatment credit for UV light, supplies shall treat not less than 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in subdivision (a) to (b) of this subrule. Supplies shall demonstrate compliance with this condition by the monitoring required under paragraph (i) of this subdivision.

**R 325.10611n Enhanced treatment for Cryptosporidium; requirements to respond to significant deficiencies identified in sanitary surveys performed by the U.S. environmental protection agency (EPA).**

Rule 611n. (1) A sanitary survey is an onsite review of the water source, identifying sources of contamination by using results of source water assessments where available, facilities, equipment, operation, maintenance, and monitoring compliance of a community or noncommunity water supply to evaluate the adequacy of the supply, its sources and operations, and the distribution of safe drinking water. Community or noncommunity water supplies are also considered "water supplies" or "supplies" in this rule.

(2) For the purposes of this rule, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

(3) For sanitary surveys performed by EPA, water supplies shall respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the supply will address significant deficiencies noted in the survey.

(4) Supplies shall correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under subrule (3) of this rule if those deficiencies are within the control of the supply.

**R 325.10612 Groundwater supply rules; general requirements and applicability.**

Rule 612. (1) This rule, R 325.10612a, and R 325.10739 to R 325.10739b apply to all community and noncommunity water supplies that use groundwater except that it does not apply to public water supplies that combine all of their groundwater with surface water or with groundwater under the direct influence of surface water before treatment under R 325.10611. For the purposes of this rule, R 325.10612a, and R 325.10739 to R 325.10739b, "groundwater supply" is defined as any community water supply or noncommunity water supply meeting this applicability statement, including consecutive supplies receiving finished groundwater.

(2) Groundwater supplies subject to this rule shall comply with all of the following requirements:

(a) Groundwater supplies shall provide the department, at the department's request, any existing information that will enable the department to conduct a sanitary survey as defined in R 325.10108.

(b) Microbial source water monitoring requirements for groundwater supplies that do not treat all of their groundwater to not less than 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer as described in R 325.10739.

(c) Treatment technique requirements, described in R 325.10612a, that apply to groundwater supplies that have fecally contaminated source waters, as determined by source water monitoring conducted under R 325.10739, or that have significant deficiencies. A significant deficiency includes, but is not limited to, a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the department determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers. A groundwater supply with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this rule shall implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves not less than 4-log treatment of viruses, using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal, before or at the first customer.

(d) Groundwater supplies that provide not less than 4-log treatment of viruses, using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal, before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in R 325.10739a.

(e) If requested by the department, groundwater supplies shall provide the department with any existing information that will enable the department to perform a hydrogeologic sensitivity assessment. For the purposes of this rule, "hydrogeologic sensitivity assessment" is a determination of whether groundwater supplies obtain water from hydrogeologically sensitive settings.

(f) Groundwater supplies shall comply, unless otherwise required, with the requirements of this rule beginning December 1, 2009.

**R 325.10612a Groundwater supply rules; treatment technique requirements for groundwater supplies.**

**Rule 612a. (1)** All of the following apply to groundwater supplies that are subject to R 325.10612 with significant deficiencies or source water fecal contamination:

(a) The treatment technique requirements of this rule shall be met by groundwater supplies when a significant deficiency is identified or when a groundwater source sample collected under R 325.10739(1)(c) is fecal indicator-positive.

(b) If directed by the department, a groundwater supply with a groundwater source sample collected under sampling requirements of R 325.10739(1)(b), consecutive and wholesale supply requirements of R 325.10739(1)(d), or assessment source water requirements of R 325.10739(2) that is fecal indicator-positive shall comply with the treatment technique requirements of this rule.

(c) When a significant deficiency is identified at a Subpart H supply that uses both groundwater and surface water or groundwater under the direct influence of surface water, the Subpart H supply shall comply with this subrule except in cases where the department determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or groundwater under the direct influence of surface water.

(d) Unless the department directs the groundwater supply to implement a specific corrective action, the groundwater supply shall consult with the department regarding the appropriate corrective action within 30 days of receiving written notice from the department of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under R 325.10739(1)(c) was found to be fecal indicator-positive, or direction from the department that a fecal indicator-positive collected under sampling requirements of R 325.10739(1)(b), consecutive and wholesale supply requirements of R 325.10739(1)(d), or assessment source water requirements of R 325.10739(2) requires corrective action. For the purposes of this rule, R 325.10612, and R 325.10739 to R 325.10739b, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the department determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(e) Within 120 days, or earlier if directed by the department, of receiving written notification from the department of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under R 325.10739(1)(c) was found to be fecal indicator-positive, or direction from the department that a fecal indicator-positive sample collected under sampling requirements of R 325.10739(1)(b), consecutive and wholesale supply requirements of R 325.10739(1)(d), or assessment source water requirements of R 325.10739(2) requires corrective action, the groundwater supply shall comply with either of the following:

(i) Have completed corrective action under applicable department plan review processes or other department guidance or direction, if any, including department-specified interim measures.

(ii) Be in compliance with a department-approved corrective action plan and schedule subject to both of the following conditions:

(A) Any subsequent modifications to a department-approved corrective action plan and schedule shall also be approved by the department.

(B) If the department specifies interim measures for protection of the public health pending department approval of the corrective action plan and schedule or pending completion of the corrective action plan, the groundwater supply shall comply with these interim measures as well as with any schedule specified by the department.

(f) Groundwater supplies that meet the conditions of subdivision (a) or (b) of this subrule shall implement 1 or more of the following corrective action alternatives:

(i) Correct all significant deficiencies.

(ii) Provide an alternate source of water.

(iii) Eliminate the source of contamination.

(iv) Provide treatment that reliably achieves not less than 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.

(g) A community groundwater supply that receives notice from the department of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated by the department under R 325.10739(3) is subject to R 325.10408c.

(2) Both of the following shall conduct compliance monitoring under R 325.10739a:

(a) A groundwater supply that is not required to meet the source water monitoring requirements of R 325.10612, this rule, R 325.10612b, or R 325.10739 to R 325.10739b for 1 or more groundwater sources because it provides not less than 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-

log virus inactivation and removal) before or at the first customer for 1 or more groundwater sources before December 1, 2009.

(b) A groundwater supply that places a groundwater source in service after November 30, 2009, that is not required to meet the source water monitoring requirements of R 325.10612, this rule, R 325.10612b, or R 325.10739 to R 325.10739b because the groundwater supply provides not less than 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.

(3) A groundwater supply may discontinue 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source if the department determines and documents in writing that 4-log treatment of viruses is no longer necessary for that groundwater source. A groundwater supply that discontinues 4-log treatment of viruses is subject to the source water monitoring requirements of R 325.10739.

**R 325.10612b Groundwater supply rules; treatment technique violations for groundwater supplies.**

**Rule 612b.** (1) A groundwater supply subject to R 325.10612 with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the department) of receiving written notice from the department of the significant deficiency, either of the following conditions exist:

(a) The groundwater supply does not complete corrective action under any applicable department plan review processes or other department guidance and direction, including department specified interim actions and measures.

(b) The groundwater supply is not in compliance with a department-approved corrective action plan and schedule.

(2) Unless the department invalidates a fecal indicator-positive groundwater source sample under R 325.10739(3), a groundwater supply is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the department) of meeting the conditions of R 325.10612a(1)(a) or (b), either of the following conditions exist:

(a) The groundwater supply does not complete corrective action under any applicable department plan review processes or other department guidance and direction, including department-specified interim measures, or

(b) The groundwater supply is not in compliance with a department-approved corrective action plan and schedule.

(3) A groundwater supply subject to the requirements of R 325.10739a(3) that fails to maintain not less than 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source is in violation of the treatment technique requirement if the failure is not corrected within 4 hours of determining the groundwater supply is not maintaining not less than 4-log treatment of viruses before or at the first customer.

(4) A groundwater supply shall give public notification under R 325.10403 for the treatment technique violations specified in subrules (1) to (3) of this rule.